

****Pre-Decisional ESA Document – Not for Distribution****

**WEST COAST STEELHEAD SALMON
ADMIN. RECORD**

**Status Review Update for
Deferred ESUs of West Coast Steelhead:
Hatchery Populations**

**(Lower Columbia River, Klamath Mountains
Province, Northern California, and Central Valley)**

Prepared by the
West Coast Steelhead Biological Review Team*

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* The Biological Review Team (BRT) for the updated status review for West Coast Steelhead included Peggy Busby, Dr. Richard Gustafson, Dr. Robert Iwamoto, Dr. Conrad Mahnken, Gene Matthews, Dr. James Myers, Dr. Mary Ruckelshaus, Dr. Michael Schiewe, Dr. Thomas Wainwright, Dr. Robin Waples, and Dr. John Williams, from NMFS Northwest Fisheries Science Center (NWFSC); Dr. Peter Adams and Dr. Paul Spencer, from NMFS Southwest Fisheries Science Center (SWFSC); Greg Bryant and Craig Wingert from NMFS Southwest Region (SWR); and Dr. Reg Reisenbichler from the Northwest Biological Science Center, USGS Biological Resources Division, Seattle.

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SUMMARY OF CONCLUSIONS

The west coast steelhead Biological Review Team (BRT) addressed two questions in regard to 24 identified steelhead hatchery populations in the Lower Columbia River, Klamath Mountains Province, Northern California, and Central Valley steelhead ESUs: 1) Are they part of the ESU? and 2) if they are part of the ESU, are they essential for recovery of the listed species? The BRT considered broodstock histories, present and past broodstock collection methods, available genetic information, and impacts of stock transplantations to specific river basins prior to and during the operation of the facilities in evaluating the ESU question.

The BRT concluded that the following hatchery populations were part of the ESUs.

Lower Columbia River (ESU 4):

- Late-spawning Cowlitz Trout Hatchery stock (winter run)
- Clackamas River ODFW stock # 122

Klamath Mountains Province (ESU 7):

- Applegate River ODFW stock # 62 (winter run)
- Upper Rogue River ODFW stock # 52 (winter run)
- Upper Rogue River ODFW stock # 52 (summer run)
- Chetco River ODFW stock # 96 (winter run)
- Iron Gate Hatchery stock (winter run)
- Trinity River Hatchery stock (winter run)
- Rowdy Creek Hatchery stock

Northern California (ESU 8):

- Van Arsdale Fisheries Station stock
- Yager Creek stock
- Ten Mile River stock
- North Fork Gualala River stock

Central Valley (ESU 12):

- Coleman National Fish Hatchery stock
- Feather River Hatchery stock (winter run).

The BRT concluded that the following hatchery populations were not part of the ESUs.

Lower Columbia River (ESU 4):

- Chambers Creek/lower Columbia River mix (early-spawning winter run)
- Skamania Hatchery stock (summer run)
- Eagle Creek National Fish Hatchery stock (ODFW stock # 19) (winter run)
- Clackamas River ODFW stock # 20 (winter run)

Northern California (ESU 8):

- Mad River Hatchery stock (summer run)
- Mad River Hatchery stock (winter run)

Central Valley (ESU 12):

- Nimbus Hatchery stock
- Mokelumne Hatchery stock.

The BRT concluded that the following hatchery population was of uncertain ESU status.

- Hood River ODFW stock # 50 (winter run).

In evaluating the importance of hatchery stocks in the ESU for recovery, the BRT considered the relationship between the natural and hatchery populations and the degree of risk faced by the natural population(s). Although the BRT recognized that many of these stocks might play an important role in recovery, no hatchery populations in these four ESUs were identified as essential for recovery.

INTRODUCTION

The Biological Review Team (BRT) for the west coast steelhead status review met in Seattle, 20-21 November 1997, to discuss new information received regarding status of seven evolutionarily significant units (ESUs) under the Endangered Species Act (ESA). At that time the BRT concluded that four ESUs, which had been deferred from final listing in August of 1997 due to substantial scientific disagreement (Lower Columbia River, Klamath Mountains Province, Northern California, and Central Valley), remained at risk of endangerment. Time constraints did not allow the BRT to address the ESA status of hatchery populations in these ESUs at that time. However, the BRT met by e-mail in December of 1997 and by conference call on 16 December 1997 and reached conclusions concerning the ESU status of hatchery stocks and their importance for recovery. This document is a supplement to the 18 December 1997 memorandum entitled "Status Review Update for Deferred and Candidate ESUs of West Coast Steelhead," and summarizes information on steelhead hatchery stocks in these four ESUs, comments received from co-managers, and conclusions of the BRT.

If any of the ESUs under consideration (Lower Columbia River, Klamath Mountains Province, Northern California, or Central Valley) are identified as threatened or endangered in the final listing determination, it will be necessary for NMFS to determine the ESA status of hatchery populations that are associated with the listed ESU(s). According to NMFS policy (NMFS 1993, see also Hard et al. 1992), two key questions must be addressed for each hatchery stock associated with a listed species: 1) Is it part of the ESU? And, if so, 2) Should the hatchery population be listed? The focus of these evaluations should be on "existing hatchery fish," which are defined in the policy to include prespawning adults, eggs, or juveniles held in a facility, as well as fish that were released prior to the listing but have not completed their life cycle.

The first question--the ESU status of existing hatchery populations--is a biological one, and the guiding principle should be whether the hatchery population contains genetic resources similar to those of natural populations in the ESU. The second question is an administrative one. According to NMFS policy, existing fish would generally not be listed even if they are part of the ESU unless they are considered "essential" for recovery (see discussion below).

To address the ESU question, the BRT considered information on stock histories and broodstock collection methods for existing hatchery populations associated with the four ESUs. Additionally, where available, the BRT considered genetic information on hatchery populations and their relationship with naturally spawning populations within and outside of the ESU. In evaluating the importance of hatchery stocks for recovery, the BRT considered the relationship between the natural and hatchery populations and the degree of risk faced by the natural population(s). Hatchery programs that have not recently produced steelhead were not considered.

It is important to note two considerations with respect to the evaluations of hatchery populations. First, the BRT conclusions apply to individual hatchery stocks and not to facilities. Stock number for Oregon hatchery stocks are included to allow identification of the stocks in question in this document. Second, a determination that a stock is not "essential" for recovery does not preclude it from playing a role in recovery. Any hatchery population that is part of the ESU is available for use in recovery if conditions warrant. In this context, an "essential" hatchery population is one that is vital to the success of recovery efforts at the outset (for example, if the associated natural population(s) were already extinct or at high risk of extinction). Under these circumstances, NMFS would consider taking the administrative action of listing the existing hatchery population at the time of the final listing determination. Fish that are progeny of listed fish taken into a hatchery for broodstock automatically will be listed, so any hatchery population involved in formal recovery under the ESA eventually will be comprised of listed fish.

STEELHEAD HATCHERY STOCKS

Key information NMFS considers in evaluating the ESU status of hatchery populations includes stock histories and broodstock collection methods, both at present and in the past. Impacts of artificial propagation to specific river basins prior to and during the operation of the facilities are also considered. In some cases, although hatcheries obtained broodstock from local sources, the local population may already have been substantially changed due to previous introductions of non-native fish. As part of the process of evaluating the ESU status and importance of stocks for recovery, draft hatchery stock summaries were provided to co-managers for review. Both the BRT's stock summaries and comments received from the co-managers are summarized in this section.

Lower Columbia River (ESU 4)

Current Washington and Oregon hatchery steelhead stocks being considered in this document include:

Chambers Creek/lower Columbia River mix (early spawning winter run)

- 1) Cowlitz Trout Hatchery stock
- 2) Merwin Hatchery stock
- 3) Skamania Hatchery stock
- 4) Beaver Creek Hatchery (ESU 3)

Late-spawning Cowlitz River stock (winter run)

Skamania Hatchery stock (summer run)

- 1) Cowlitz Trout Hatchery stock
- 2) Skamania Hatchery stock
- 3) Merwin Hatchery stock
- 4) Bonneville Hatchery

Eagle Creek National Fish Hatchery stock (Clackamas River ODFW stock # 19) (winter run)

Clackamas River ODFW stock # 20 (winter run)

Clackamas River ODFW stock # 122 (winter run)

Hood River ODFW stock # 50 (winter run)

Chambers Creek/Lower Columbia River mix (early-spawning winter run)--These early timed winter steelhead stocks were derived from mixtures of steelhead from Chambers Creek Hatchery (located near Tacoma, Washington in the Puget Sound ESU 1) and native lower Columbia River winter steelhead. Broodstock collection takes place at 1) Cowlitz Trout Hatchery on the Cowlitz River, 2) Merwin Hatchery on the North Fork Lewis River, 3) Skamania Hatchery on the Washougal River, and 4) Beaver Creek Hatchery on the Elochoman River (ESU 3). Additional rearing sites for these stocks are 1) Cowlitz Salmon Hatchery, 2) Gobar Pond on the Kalama River, 3) Klineline Pond on Salmon Creek, 4) lower and middle

Coweeman Ponds on the Coweeman River, and 5) various gravel ponds on the Cowlitz River (Crawford 1997).

Cowlitz Trout Hatchery (WDFW)--The Cowlitz Trout Hatchery began operation in 1967 as a mitigation facility for hydroelectric dams blocking the Cowlitz River and is funded by Tacoma City Light and operated by WDFW (Wold 1993). The winter steelhead stock at this hatchery was developed in the late 1960s from a mixture of Chambers Creek and native Cowlitz River stocks (Tipping 1984). As a result, only 34% of the stock has the 58 chromosome count expected for Lower Columbia River steelhead (Howell et al. 1985). Fish are collected and spawned at the hatchery in December and January; hatchery fish spawn in the river through March, and wild fish spawn in the river in April and May (Howell et al. 1985).

Merwin Hatchery (WDFW)--Merwin Hatchery is located on the North Fork Lewis River. Rearing of juvenile steelhead at the Merwin Net Pens was discontinued when this hatchery program began. A separate broodstock originating from a mixture of Chambers Creek Hatchery steelhead and native lower Columbia River winter steelhead is maintained at this hatchery.

Skamania Hatchery (WDFW)--Skamania Hatchery is located on the Washougal River, Washington. The Skamania winter steelhead stock was developed primarily from a combination of Elochoman River (ESU 3) and Cowlitz Trout Hatchery (ESU 4) stock. Cowlitz Trout Hatchery stock was originally a mixture of Chambers Creek Hatchery stock and Cowlitz River winter steelhead. Some native Washougal River winter steelhead were also included in the Skamania winter broodstock in some broodyears (Crawford 1979, Howell et al. 1985). Eggs are taken from fish returning to the Skamania Hatchery and are reared on site or at satellite rearing locations.

Beaver Creek Hatchery (WDFW)--Beaver Creek Hatchery is located on the Elochoman River in ESU 3, but rears winter steelhead from the North Fork Lewis River (NRC 1995) and progeny of a Chambers Creek/lower Columbia River mixed winter steelhead stock that returns to the hatchery.

Comments Received

Based on comments received from WDFW, the hatchery stock description for Cowlitz and North Fork Lewis Rivers and Skamania stock winter run steelhead were rolled up into a single stock description as a Chambers Creek/lower Columbia River mixed stock of early-spawning winter steelhead. This stock consists of Chambers Creek Hatchery (Puget Sound ESU 1) steelhead that were crossed with either native Cowlitz, Elochoman (ESU 3), or Washougal Rivers steelhead starting in the late 1960s. Brood stock are collected at Beaver Creek Hatchery (Elochoman River), Cowlitz Trout Hatchery, Merwin Hatchery (N.F. Lewis River), and Skamania Hatchery (Washougal River). WDFW reports that this stock performs poorly as natural spawners, most likely due to its outside the ESU origin and selection for early spawn timing. Based on partial origin from outside the ESU, selection for early spawn

timing, and different genetic profile from native fish, WDFW stated that this stock should not be part of ESU 4, nor should it be considered essential for recovery.

Late-spawning Cowlitz River stock (winter run), (Cowlitz Trout Hatchery (WDFW))—Late-run Cowlitz River winter steelhead stock are also reared at Cowlitz Trout Hatchery. This stock was developed in the late 1960s from April and May spawners; 100% of these fish have 58 chromosomes (Howell et al. 1985).

Comments Received

WDFW stated that the late-spawning Cowlitz River winter steelhead stock is separated from the Chambers Creek-mixed-origin early spawners by a no-spawn period from late February to early April at the Cowlitz Trout Hatchery. These late-spawning fish are spawned from early April to late May, coincident with spawn timing of native fish. Recent WDFW genetic data indicate that this hatchery stock clusters most closely with late-spawning wild winter steelhead from the Clackamas River, Oregon. When tested in 1974, this stock exhibited the 58 chromosomes typical of native Columbia River Basin steelhead; Puget Sound steelhead have 59 or 60 chromosomes. This stock is currently being used to reintroduce steelhead to the upper Cowlitz River. WDFW stated that it cannot rule out the possibility that Cowlitz River late spawning winter steelhead contain genetic resources representative of the late winter type in this ESU, and that their conservative approach is to place this stock in ESU 4. WDFW believes this stock is not essential for recovery based on an estimated number of 4000+ wild steelhead in the ESU and the uncertainty about the performance of this hatchery stock in the above mentioned restoration effort. WDFW stated that hatchery steelhead in the Upper Columbia River ESU were determined essential for recovery because they were genetically similar to wild fish and the wild fish were no longer self-perpetuating; however, in the Lower Columbia River ESU, the wild stock is self perpetuating and therefore hatchery stocks are not essential for recovery.

Skamania Hatchery stock (summer run), (Skamania Hatchery, Merwin Hatchery, Cowlitz Trout Hatchery (WDFW), and Bonneville Hatchery(ODFW))—The Skamania summer steelhead hatchery stock was developed in the late 1950s from native Washougal River and Klickitat River (ESU 13) summer steelhead. Eggs are taken from steelhead returning to Cowlitz Trout, Merwin, Skamania, and Bonneville hatcheries and juveniles are reared primarily on site or at Beaver Creek Hatchery on the Elochoman River, North Toutle Hatchery on the Green River (a tributary of the Toutle River), South Fork Toutle River trap, and Gobar Pond on the Kalama River. Returns of Skamania summer steelhead to Ringold Springs Rearing Pond, located in ESU 13 on the Columbia River, are spawned at Yakima Hatchery and rearing occurs at Ringold Springs and various other hatcheries in the Naches and Columbia River Basins (Howell et al 1985). Progeny of Skamania summer steelhead that return to Skamania Hatchery are routinely released into Washington tributaries of the Columbia River from the Klickitat River downstream and progeny of those that return to Ringold Springs Rearing Pond are released in Columbia River tributaries from the Klickitat River upstream (Howell et al. 1985).

Beaver Creek Hatchery (WDFW)--Beaver Creek Hatchery is located on the Elochoman River in ESU 3, but has recently reared summer steelhead derived from the North Fork Lewis River (NRC 1995) and from eggs transferred from Skamania Hatchery.

Cowlitz Trout Hatchery (WDFW)--The Cowlitz Hatchery rears introduced Skamania stock summer steelhead, which are not native to the Cowlitz River Basin (Wold 1993). This stock was developed in the early 1970s predominantly from the Skamania Hatchery steelhead stock (Crawford 1979, Howell et al. 1985). Currently, eggs are taken from Cowlitz River summer steelhead that return to the Cowlitz Trout Hatchery.

Vancouver Hatchery (WDFW)--The Vancouver Hatchery (located just east of Vancouver, Washington on the Columbia River) began operation in the 1930s (Wold 1993). Both winter and summer steelhead stocks reared at this hatchery were imported from other ESUs and watersheds for rearing and off-station plants (Wold 1993).

Gobar Pond (WDFW) (located on a tributary of the Kalama River) was constructed by the Weyerhaeuser Corporation in 1975 and is operated as a satellite of the WDFW Beaver Creek Hatchery (ESU 3) (Wold 1993). Both hatchery stocks of winter (derived from a combination of Chambers Creek - ESU 1, Cowlitz - ESU 4, and Beaver Creek - ESU 3) and summer (Skamania) steelhead reared at this facility have been developed from sources outside the Kalama River (Howell et al. 1985).

The South Fork Toutle River trap (WDFW) was listed by NRC (1995) as a rearing facility for the Skamania summer steelhead stock.

Bonneville Hatchery (ODFW)--Bonneville Hatchery, located just west of Cascade Locks at Bonneville Dam on the Oregon side of the Columbia River, began operation in 1894 as a state hatchery (Delarm and Smith 1990). In 1957 and 1974, Bonneville Hatchery was enlarged and renovated. It is currently funded jointly by NMFS and the Army Corps of Engineers. Chilcote (1997b) stated that Skamania summer steelhead are raised at Bonneville Hatchery and released in the Sandy, Clackamas, and Hood Rivers.

Comments Received

WDFW stated that Skamania Hatchery, Merwin Hatchery, and Cowlitz Trout Hatchery each maintain their own Skamania summer broodstock. This stock originated primarily from native Washougal River summer steelhead at the Skamania Hatchery. Over the last 20 years, spawn timing has been advanced by over three months, and significant interbreeding with wild fish has not occurred. Due to its mixed genetic heritage, poor reproductive success when measured in the wild, and altered spawn timing, WDFW does not consider this stock to be part of ESU 4.

ODFW stated that Skamania summer steelhead raised at Bonneville Hatchery are released into the Sandy, Clackamas, and Hood Rivers. ODFW placed this stock in ESU 4, although they did not elaborate. Without exception, ODFW stated that all hatchery stocks in this ESU are not essential for recovery, since their analysis indicates that this ESU is not at risk of extinction.

USFWS stated that currently Skamania summer steelhead stock are not reared at Eagle Creek NFH, although 600,000 eggs from this stock were imported in 1970 (one year only) and a summer steelhead run was never established.

Eagle Creek National Fish Hatchery stock (Clackamas River ODFW stock # 19) (winter run), (Eagle Creek National Fish Hatchery (USFWS) and Clackamas Hatchery (ODFW))--The Eagle Creek National Fish Hatchery (NFH), located on a tributary of the Clackamas River, was constructed as a Mitchell Act hatchery in 1956 (Christianson 1993). The Eagle Creek winter steelhead stock was developed from mixtures of native late-run Clackamas River fish, beginning with the 1957 broodyear; introduced early-run fish from Big Creek Hatchery (ESU 3), imported during the 1960s and 1970s (Howell et al. 1985); and Donaldson rainbow trout from the University of Washington (ODFW 1986, 1995b). Steelhead imported from Alsea Hatchery (ESU 6) in 1972-73 were reportedly derived from Big Creek Hatchery. Although spawning of this stock is conducted over the duration of the run, the early portion of the run is thought to be primarily of Big Creek Hatchery (ESU 3) origin, and the later part of Clackamas River origin (Howell et al. 1985). At present, non-indigenous Big Creek steelhead are still being released into the Clackamas River (ODFW 1995b).

Comments Received

USFWS stated that Alsea River steelhead were never imported to Eagle Creek NFH, but that all imports from Alsea River Hatchery consisted of Big Creek Hatchery (ESU 3) steelhead that had been raised at Alsea River Hatchery prior to transfer to Eagle Creek. Big Creek Hatchery stock were imported to Eagle Creek from 1965-1979, but none have been released from Eagle Creek since 1979. In 1973, returns of Big Creek steelhead were spawned from January 23 to March 9 at Eagle Creek NFH, while native Eagle Creek winter steelhead were spawned from March 9 to May 10 (although native fish continued to arrive into June). Currently, spawning at Eagle Creek NFH extends from late December through the end of March, and adult returns no longer exhibit a distinct bimodal distribution as they did in the early 1970s. USFWS stated that this stock should not be included in ESU 4, since it is largely derived from Big Creek steelhead imported from outside the ESU. They also stated that some introgression of native Eagle Creek fish may be responsible for the latter part of the run.

ODFW agreed that this stock is largely of mixed origin, but also stated that this stock was in the ESU, and not essential for recovery. It is possible that some confusion with the boundary of ESUs 3 and 4 contributed to this statement; in the co-managers draft of the west coast steelhead status review, Big Creek was placed in ESU 4, whereas the status review, as published, placed Big Creek in ESU 3.

Clackamas River ODFW stock # 20 (winter run), (Clackamas Hatchery (ODFW))--

The Clackamas Hatchery, located on the Clackamas River, began operation in 1979 and is currently operated by ODFW as a Mitchell Act hatchery and is funded by ODFW, NMFS, Portland General Electric, and the City of Portland (Christianson 1993). The Clackamas Hatchery rears late-spawning (March-April) winter steelhead imported from the Eagle Creek NFH (ODFW stock # 20), and since 1991, has used a broodstock consisting of late-returning winter steelhead collected at North Fork Dam (ODFW 1995a). Smolts from this program are released in the Clackamas River. This stock is derived from the Eagle Creek NFH stock described above, which itself was derived largely from Big Creek Hatchery winter steelhead.

Comments Received

ODFW stated that this stock is of mixed origin, although they did not elaborate. ODFW placed this stock within ESU 4 (see above comments concerning Big Creek Hatchery and boundary of ESUs 3 and 4), but stated that it is not essential for recovery.

Clackamas River ODFW stock # 122 (winter run)--Broodstock for this recently established hatchery stock is collected in the Clackamas River and smolt are released back to the Clackamas River. We currently have no information on the trapping or rearing location of this broodstock.

Comments Received

ODFW stated that this stock was recently derived from a local wild population in the Clackamas River, and that it is part of the ESU but not essential for recovery.

Hood River ODFW stock # 50 (winter run), (Oak Springs Fish Hatchery (ODFW))--Oak Springs Hatchery began operation in 1921, and is located on the Deschutes River in Maupin, Oregon in ESU 13. ODFW (1995b) and Chilcote (1997a) reported that a new local broodstock of winter steelhead was being developed in the Hood River and that, beginning in 1995, returns of hatchery fish to the Hood River were the result of this program (Chilcote 1997a). Broodstock is collected at Powerdale Dam on the Hood River and smolt released in the East Fork Hood River. Currently, the winter steelhead broodstock for this program in the Hood River is taken throughout the duration of the run at Powerdale Dam from late-December through April (M. Jennings¹). However, Cramer (1991) stated that passage data during the 1960s at Powerdale Dam indicated that winter steelhead entered the Hood River during March through May.

¹M. Jennings, Program Coordinator, Department of Natural Resources, Confederated Tribes of the Warm Springs Reservation of Oregon, P. O. Box C, Warm Springs, OR 97761. Pers commun. to R. Gustafson, NMFS, 18 December 1997.

A number of hatchery steelhead stocks with earlier run timing than March-May have been released in the Hood River since 1962 (Cramer 1991). These include: 1) over 400,000 Carson NFH winter steelhead in 1962, 2) over 100,000 Eagle Creek NFH winter steelhead in 1963, 3) over 400 Big Creek adults in 1966-67, 4) over 56,000 Alsea River winter steelhead in 1970, 5) over 617,000 Big Creek juveniles between 1976 and 1991, and 6) over 365,000 Klaskanine River juveniles between 1985 and 1988. Big Creek steelhead return predominantly in December and January (Howell et al. 1985).

Comments Received

ODFW stated that this stock was recently derived from a local wild population in the Hood River, and that it should be part of the ESU but not essential for recovery.

Confederated Tribes of the Warm Springs Reservation stated that this program relies on local natural broodstock and that the genetic resources of the hatchery and wild stocks should be similar. Although not explicitly stated, this implies that the Confederated Tribes would place this stock within the ESU. The Confederated Tribes "views the development of these populations as essential for the recovery of naturally spawning steelhead in the Hood River."

Klamath Mountains Province (ESU 7)

Current Oregon and California hatchery steelhead stocks being considered in this document include:

- Applegate River ODFW stock # 62 (winter run)
- Upper Rogue River ODFW stock # 52 (winter run)
- Upper Rogue River ODFW stock # 52 (summer run)
- Chetco River ODFW stock # 96 (winter run)
- Iron Gate Hatchery stock (winter run)
- Trinity River Hatchery stock (winter run)
- Rowdy Creek Hatchery stock

Applegate River ODFW stock # 62 (winter run), (Cole M. Rivers Fish Hatchery (ODFW))--Cole Rivers Hatchery is located below Lost Creek Dam on the Rogue River, in Jackson County, Oregon, and has been operated by ODFW since 1973 (Busby et al. 1996). The Applegate River winter steelhead stock was developed in 1979 from indigenous fish returning to Applegate Dam together with some Rogue River winter steelhead (ODFW 1995a). Wild fish have not been included in this broodstock in recent years (ODFW 1995b).

Comments Received

ODFW stated that this stock is of Applegate River origin, is in the ESU, and is not essential for recovery. Without exception, ODFW stated that all hatchery stocks in this ESU are not essential for recovery, since their analysis indicates that this ESU is not at risk of extinction.

Upper Rogue River ODFW stock # 52 (winter run), (Cole M. Rivers Fish Hatchery (ODFW))--The Upper Rogue River winter steelhead stock is also reared at Cole M. Rivers Hatchery. This stock was developed from indigenous Rogue River fish in 1974 (ODFW 1995a). Wild fish have not been included in this broodstock in recent years (ODFW 1995b).

Comments Received

ODFW stated that this stock is of upper Rogue River origin, and that it is part of the ESU but not essential for recovery.

Upper Rogue River ODFW stock # 52 (summer run), (Cole M. Rivers Fish Hatchery (ODFW))--Rogue River summer steelhead have been reared at Cole Rivers Hatchery since 1974. The original source of this stock was native summer steelhead collected at Gold Ray Dam in 1962. Current production mitigates lost natural spawning above Lost Creek Dam. Since 1974, only fish collected at Cole Rivers Hatchery have been used for summer steelhead broodstock.

Comments Received

ODFW stated that this stock is of upper Rogue River origin, and that it is part of the ESU but not essential for recovery.

Chetco River ODFW stock # 96 (winter run), (Elk River Fish Hatchery (ODFW))--Elk River Hatchery is located on the Elk River, just north of Port Orford, in Curry County, Oregon and has been operated by ODFW since 1969 (Busby et al. 1996). Beginning in 1970, the Chetco River winter steelhead stock was developed from fish returning to the Chetco River. This stock is reared at Elk River Hatchery and resulting smolts are released back into the Chetco River. Broodstock consists of hatchery and wild adults trapped on Jack Creek on the Chetco River. ODFW (1986, 1995a) stated that for several years prior to 1970 the Chetco River was planted with Alsea Fish Hatchery stock. Likewise, ODFW (1995b) stated that from 1969 to 1977, Alsea Fish Hatchery winter steelhead were released in the Chetco River.

Comments Received

ODFW stated that this stock was recently derived from a local wild population in the Chetco River, and that it is part of the ESU but not essential for recovery.

Iron Gate Hatchery stock (winter run), (Iron Gate Hatchery (CDFG))--Iron Gate Hatchery is on the Klamath River eight miles east of Hornbrook, California and has reared and released steelhead since 1966 (Busby et al. 1994). This hatchery was built by Pacific Power and Light Company to mitigate the Iron Gate Project and is operated by CDFG. The winter steelhead stock was developed mostly from indigenous stock, although about 260,000 Trinity River Hatchery (ESU 7), 67,000 Cowlitz River Hatchery (ESU 4), and 9,000 Mad River Hatchery (ESU 8) steelhead were released in the Klamath River in 1969-1971, 1970, and 1975, respectively (Busby et al. 1994, NRC 1995). Adult steelhead are trapped at the Iron Gate Hatchery site and all progeny are planted back into the Klamath River at the hatchery. A total of 271, 12, and 97 adult steelhead were trapped at Iron Gate Hatchery in broodyears 1995, 1996, and 1997, respectively. Iron Gate Hatchery released 74,000, 163,000, and 10,700 steelhead from broodyears 1994, 1995, and 1996, respectively (Hiser 1995; Rushton 1996, 1997). There does not appear to be a current summer steelhead program at Iron Gate Hatchery; according to our information the last recorded rearing of summer steelhead at this hatchery occurred in the late 1960s (NRC 1995). We have no information on the percent of Iron Gate Hatchery stock spawning in the wild or other potential hatchery fish/wild fish interactions.

Comments Received

CDFG stated that given this stock was founded with indigenous steelhead and that because only limited stock importation has occurred, they believe it should be in the Klamath Mountains Province ESU. CDFG also stated that due to the severe decline in adults returning to Iron Gate Hatchery (93% decline between the 1980s and 1990s), which they attribute to inadequate habitat conditions in the mainstem Klamath River, the Iron Gate Hatchery stock should be considered essential for recovery of Klamath River winter steelhead.

Trinity River Hatchery stock (winter run), (Trinity River Hatchery (CDFG))--Trinity River Hatchery is located on the Trinity River, below Trinity Dam, in Lewiston, California, and has been operated by CDFG since 1958 (Busby et al. 1994). The winter steelhead stock at this hatchery was developed mostly from indigenous stock, although over 2.8 million Iron Gate Hatchery (ESU 7), about 65,000 Eel River (ESU 8), and 71,000 Mad River Hatchery (ESU 8) steelhead were released here in 1971-1987, 1971-1974, and 1971, respectively (Busby et al. 1994, NRC 1995). There does not appear to be a current summer steelhead program at Trinity River Hatchery, although over 229,000 Skamania summer steelhead were reared here between 1971 and 1976 (NRC 1995). Currently, only winter steelhead return to the hatchery.

Comments Received

CDFG stated that virtually all steelhead entering Trinity River Hatchery are of hatchery origin, and that naturally-produced steelhead in the Trinity River have a more protracted run than hatchery-produced steelhead. CDFG stated that since this stock was founded mostly from indigenous sources it should be considered part of the ESU. However, since CDFG believes the

wild stock is stable and relatively healthy in the Trinity River, they do not believe that this stock is essential for recovery.

Rowdy Creek Hatchery stock, (Rowdy Creek Fish Hatchery (California CO-OP, Kiwanis Club of Smith River))--Rowdy Creek Hatchery is located in Smith River, California at the confluence of Rowdy and Dominie Creeks, tributaries of the Smith River. This hatchery is a small cooperative (CDFG and volunteers) that was built by the Kiwanis Club of Smith River and has operated continuously since 1968 (Radford 1996). This hatchery began releasing indigenous Rowdy Creek winter steelhead in 1983 (NRC 1995). About 24,000 Mad River Hatchery (ESU 8) winter steelhead were released here in 1979, but we have no further information on broodstocks at this hatchery, prior to 1983. Adult steelhead trapped at this facility in 1995, 1996, and 1997 amounted to 271, 1,242, and 1,051, respectively (D. McEwan²). Over 121,000 steelhead smolt of this stock were released in the spring of 1995 in the Smith River Basin (Radford 1996). In 1996 and 1997 approximately 58,000 and 102,000 steelhead smolts, respectively, were released into the Smith River Basin from this facility (D. McEwan²).

Comments Received

CDFG stated that "this stock could be considered part of the KMP ESU," but the wild stock is stable and healthy and therefore the hatchery stock is not essential for recovery.

Northern California (ESU 8)

Current California hatchery steelhead stocks being considered in this document include:

- Van Arsdale Fisheries Station stock (Eel River)
- Yager Creek stock (Eel River tributary)
- Ten Mile River stock
- North Fork Gualala River stock
- Mad River Hatchery stock (summer run)
- Mad River Hatchery stock (winter run)

Van Arsdale Fisheries Station stock, (Van Arsdale Fisheries Station (CDFG))--The Van Arsdale Station (formerly known as Snow Mountain Station or Cape Horn Dam Station) is located at the base of Cape Horn Dam on the upper Eel River and has been operated as an egg taking station since the 1969-70 season. Eggs are collected from adult steelhead migrating to the base of the dam. Between 1974 and 1981, winter steelhead eggs were reared at the Mad River Hatchery and smolts released back into the Eel River. Since 1980, winter steelhead have been reared on site at Van Arsdale Fisheries Station, as well as at Mad River Hatchery. About 76,000

²D. McEwan, Inland Fisheries Division, California Department of Fish and Game, 1416 Ninth St., P. O. Box 944209, Sacramento, CA 94244-2090. Pers. commun. to G. Bryant, NMFS.

Russian River (ESU 9) steelhead were released in the Eel River in 1985 (NRC 1995). From 1978 to present, winter steelhead taken for broodstock at the Vans Arsdale trap have been designated as Van Arsdale stock (NRC 1995).

Comments Received

CDFG stated that the purpose of the Van Arsdale facility is to supplement natural stocks of the upper Eel River. CDFG stated that given that this stock was founded with indigenous stock with relatively limited stock importation, it should be included in the ESU. Due to severe declines in natural steelhead adults in the upper Eel River, CDFG believes that this stock is essential for recovery of upper Eel River winter steelhead.

Yager Creek stock, (California CO-OP (CDFG/Pacific Lumber Co.))--The Yager Creek trapping and rearing facility is located at the confluence of Yager and Cooper Mill Creeks (tributaries of the Van Duzen River, which in turn is a tributary of the Eel River). The Pacific Lumber Co. operates this facility, and three satellite rearing facilities, which have been in operation since 1976 (Radford 1996). Winter steelhead smolts from this program are released into Yager Creek and its tributaries. Over 20,000 were released in the spring of 1994 (NRC 1995) and 6,500 were released in spring of 1995 (Radford 1996). Over 9,700 steelhead smolt of the 1996 broodyear were released in the Yager Creek Basin (in S. F. Yager, Cooper Mill, and Lawrence Creeks) in 1997 (D. McEwan³). About 4,600 Freshwater Creek (a tributary of Humboldt Bay) juvenile steelhead were released in the Yager Creek Basin in 1993 (NRC 1995).

Comments Received

CDFG stated that the purpose of Pacific Lumber Company (PCL) facility is to supplement natural steelhead stocks on PCL property in the Eel River Basin. CDFG stated that since this stock was founded with indigenous stock and there has been relatively little stock importation they believe it should be included in the ESU. However, CDFG does not believe that this stock is essential for recovery of Eel River winter steelhead or the Northern California ESU, although they do not elaborate further.

Ten Mile River stock, (Ten Mile River Hatchery, California CO-OP (CDFG/ Salmon Restoration Association of California))--Ten Mile River Hatchery is located 9.6 km north of Fort Bragg, California on the Ten Mile River and began operation in 1975. Steelhead broodstock for this small program are obtained from the Ten Mile River and resulting progeny are released as yearlings back into the Ten Mile River (Radford 1996). In the spring of 1995 over 14,000 Ten Mile River Hatchery stock steelhead smolts were planted in the Ten Mile River (Radford 1996).

³D. McEwan, Inland Fisheries Division, California Department of Fish and Game, 1416 Ninth St., P. O. Box 944209, Sacramento, CA 94244-2090. Pers. commun. to G. Bryant, NMFS.

Comments Received

CDFG stated that the purpose of this facility is to supplement natural production in the Ten Mile River Basin. CDFG stated since this stock was founded with indigenous stock they believe it should be included in the ESU. However, CDFG does not believe that this stock is essential for recovery of Ten Mile River steelhead or the Northern California ESU, although they do not elaborate further.

North Fork Gualala River stock, (California CO-OP (CDFG/Gualala River Steelhead Project))--This project rears juvenile steelhead rescued from tributaries of the North Fork Gualala River and has been in operation since 1981. Rearing facilities are located on Doty Creek, a tributary of the Gualala River and steelhead smolts resulting from this program are released in Doty Creek (Radford 1996). In spring of 1995 this project planted 3,500 North Fork Gualala River stock steelhead in Doty Creek (Radford 1996). In 1997, 4,200 rescued steelhead were planted in Doty Creek by this project (D. McEwan⁴).

Comments Received

CDFG stated that the purpose of this facility is to supplement natural production in the Gualala River Basin. CDFG stated that this stock consists of indigenous steelhead and they believe it should be included in the ESU. However, CDFG does not believe that this stock is essential for recovery of Gualala River steelhead or the Northern California ESU, although they do not elaborate further.

Mad River Hatchery stock (summer run, Skamania stock), (Mad River Fish Hatchery (CDFG))--Mad River Hatchery is located on the Mad River near the town of Blue Lake, California, and has been operated by CDFG since 1971 (Busby et al. 1996). Summer steelhead at Mad River Hatchery are progeny of summer steelhead imported from the Eel (via an Eel River summer broodstock maintained at Trinity River Hatchery) and Washougal (Skamania summer steelhead stock) Rivers between 1972-1973 and 1971-1980, respectively (Cramer et al. 1995, Busby et al. 1996). Releases of summer steelhead from these years were adipose fin clipped in order to distinguish them from other steelhead returning to the hatchery, and adults missing the adipose fin were used as broodstock in subsequent years. In broodyears 1995 and 1996 a total of 194 and 238 adipose marked summer steelhead returned to Mad River Hatchery. About 51,000 and 127,000 summer steelhead were released from the Mad River Hatchery in spring of 1995 and 1996, respectively (Gallagher 1995, Cartwright 1996).

⁴D. McEwan, Inland Fisheries Division, California Department of Fish and Game, 1416 Ninth St., P. O. Box 944209, Sacramento, CA 94244-2090. Pers. commun. to G. Bryant, NMFS.

Comments Received

CDFG stated that this program was terminated in 1996 because natural spawners in the Mad River are abundant and the program failed to establish a spring and summer steelhead fishery. CDFG stated that the Eel River summer steelhead imported into this hatchery in 1972 did not come from the Van Arsdale Fisheries Station (Eel River) but were imported from Trinity River Hatchery, which was maintaining an Eel River summer steelhead stock at this time. During the first year of operation of this hatchery, 100% of the eggs were derived from Skamania (ESU 4) summer steelhead; during the second year, 100,000 Eel River summer steelhead fingerlings were imported from Trinity River Hatchery (representing the entire year's production); and during the third year of operation, 51% of the eggs came from Eel River summer steelhead maintained at Trinity River Hatchery and 49% from Skamania summer steelhead. CDFG stated that since the founding broodstocks for this hatchery stock were all derived from non-indigenous sources, it should not be included in the ESU.

Mad River Hatchery stock (winter run), (Mad River Fish Hatchery (CDFG))—This stock is also known as the South Fork Eel River stock and according to Cramer et al. (1995), it originated from adult steelhead trapped at Benbow Dam on the South Fork Eel River (ESU 8) in 1971. Between 1972 and 1974 broodstock at Mad River Hatchery were composed almost exclusively of South Fork Eel River steelhead (Cramer et al. 1995). By 1974, returns to the hatchery supplied about 90% of the egg take (Cramer et al. 1995); others eggs originated from Eel River steelhead. Over the years 1994, 1995, 1996, and 1997, Mad River Hatchery trapped 5,181, 10,924, 11,285, and 8,713 adult winter steelhead, respectively. Over this time period, steelhead yearling plants back into the Mad River from this hatchery ranged between approximately 330,000 and 490,000 per year (Gallagher 1994, 1995; Cartwright 1996, 1997).

Comments Received

CDFG stated that in addition to the non-indigenous sources for winter steelhead at this hatchery, 42 and 52 adult Mad River steelhead were include in the broodstock in 1971-72 and 1972-73, respectively. However, egg take from these few fish was a small percentage of the total for both years. In addition, over 500 adult San Lorenzo River (ESU 9) steelhead were spawned at Mad River Hatchery in 1972 and progeny of these fish may have been planted here. CDFG stated that this stock was founded from mostly non-indigenous sources and should not be included in the ESU.

Central Valley (ESU 12)

Current California hatchery steelhead stocks being considered in this document include:

Coleman National Fish Hatchery stock
Feather River Hatchery stock (winter run)
Nimbus Hatchery stock
Mokelumne Hatchery stock

Coleman National Fish Hatchery stock, (Coleman NFH (USFWS))--The U.S. Fish and Wildlife Service Coleman NFH, is located on Battle Creek, a tributary to the Sacramento River. Although operations at the hatchery began in 1942, steelhead were first released from here in 1948. The steelhead stock used at this hatchery was derived from Sacramento River stock(s) captured at the Keswick Dam Trap on the upper Sacramento River. Since 1948, adults returning to the hatchery have been used for broodstock, in addition to collections of adults from the Keswick Dam Trap and Red Bluff Diversion Dam Trap (upper Sacramento River). With the exception of 1979, the majority of fish released from the Coleman NFH were the progeny of fish returning to the upper Sacramento River. During 1979, 72% of the juveniles released were of Mad River Hatchery origin. Juvenile releases of Nimbus Hatchery origin (1973, 1975, 1976, 1977, 1978, and 1985) and Feather River Hatchery origin (1984) constituted 17% (on average) of the total number of fish released in those years. In all other years, broodstock were derived wholly from upper Sacramento River collections. The fish introduced from other hatcheries were all derived (originally or mostly) from coastal steelhead stocks, and it is probable that they would not have adult return rates equivalent to locally-derived stocks. Cramer et al. (1995) suggested that selection for large size may have had an effect on the stock.

Comments Received

USFWS stated that Kamloops trout (*O. m. gairdneri*) were reared at Coleman NFH in the past and released in reservoirs and on the mainstem Sacramento River and its tributaries. USFWS also speculated that occasionally these Kamloops trout may have been crossed with returning adult steelhead. USFWS believes that this stock should be considered part of the Central Valley ESU, as defined in Busby et al. (1996). This opinion is based on the genetic clustering of steelhead from Coleman NFH and those from Deer and Mill Creeks. Remaining naturally producing steelhead in the Sacramento River Basin are largely confined to Deer and Mill Creeks.

USFWS believes that this stock should be used to "assist" recovery, although they would not support proposals to supplement Deer and Mill Creeks with Coleman NFH stock. USFWS suggests that use of this hatchery stock in areas other than Deer and Mill Creek could reduce the likelihood of extinction of Central Valley steelhead.

Feather River Hatchery stock (winter run), (Feather River Hatchery (CDFG))--The Feather River Hatchery is located on the Feather River in the town of Oroville, California. There have been a number of steelhead hatcheries in the Feather River Basin. The first Feather River Hatchery began operations in 1921 with eggs from Snow Mountain Station (Eel River). The present Feather River Hatchery production mitigates the loss of naturally spawning steelhead resulting from the construction of Oroville Dam. Beginning in 1967, steelhead adults were trapped in the Feather River to establish the hatchery broodstock. In addition to the use of returning adults, a domesticated broodstock (founded from adults collected from the Feather River) was reared at the hatchery to provide additional fish for release. Nimbus Hatchery winter-run steelhead stock were incubated and released from the Feather River Hatchery in considerable numbers during the late 1970s and early 1980s. According to Reynolds et al. (1993), Nimbus Hatchery steelhead may have introgressed into the Feather River Hatchery broodstock. Over the years 1994, 1995, 1996, and 1997, the Feather River Hatchery trapped 1,594, 1,058, 269, and 2,113 adult steelhead, respectively. Over this time period, steelhead yearling plants into the Feather River from this hatchery ranged between approximately 500,000 and 800,000 per year (Schlichting 1994; Overton 1995, 1996, 1997).

During the late 1970s and early 1980s summer-run steelhead eggs from Nimbus Hatchery (Skamania stock) were reared and released from the Feather River Hatchery. This program was discontinued due to low return rates. It is unknown how much introgression occurred between summer and winter (fall) runs.

Comments Received

CDFG stated that some natural spawning takes place in the Feather River. CDFG stated that they did not "have sufficient evidence on which to base a determination on whether to include the Feather River Hatchery in the Central Valley ESU."

Nimbus Hatchery stock (CDFG)--The Nimbus Salmon and Steelhead Hatchery is located on the American River near Nimbus, California. Operations began in FY 1955-56 to mitigate the construction of Nimbus Dam (American River). From 1956-1962 an average of 230 winter-run fish entered the hatchery (January-April) each year. Due to the low return, additional eggs were acquired from the Van Arsdale Station (Eel River) (ESU 8). During the first seven years of operations, approximately 168,700 yearling smolts were released annually. Changes in rearing protocol resulted in higher returns to the hatchery and higher production. In 1978, 1988, and 1989, eggs from the Mad River Hatchery (Eel River stock) were transferred to the Nimbus Hatchery. During the 1980s, eggs from Coleman NFH were also transferred to the Nimbus Hatchery (Cramer et al. 1995). Fish from the Warm Springs Hatchery (Eel River origin) have also been utilized. In 1983 and 1990, 100,000 and 235,000 eggs (respectively) from the Warm Springs Hatchery were incorporated into the Nimbus Hatchery release in the American River. Run timing would indicate that the current Nimbus stock is Eel River (ESU 8) derived (Cramer et al. 1995)--although a later arriving (and physically smaller) portion of the steelhead run may represent native fish (McEwan and Nelson 1991). Attempts to establish broodstock using native

American River steelhead (spring-run) were hampered by low numbers and were discontinued (Cramer et al. 1995).

Summer-run steelhead from the Skamania Hatchery (ESU 4) (1969, 1970, and 1973), and from the Siletz River's Roaring River Hatchery (ESU 6) (1971) were released from the Nimbus Hatchery (Staley 1976). Declining returns lead to the discontinuation of the program in 1975, although an additional release of Skamania summer steelhead was made in 1979 (McEwan and Nelson 1991).

Comments Received

CDFG stated that between construction of Folsom Dam on the American River in 1950 and the beginning of operations at Nimbus Hatchery in 1955, there was a five year period during which steelhead could not have reached their native spawning grounds and no hatchery program was in operation. Adult returns were low for the first four years of hatchery operation, indicating that the native run had declined significantly over the previous five year period.

CDFG believes that this hatchery stock should not be part of the Central Valley ESU, as it resembles, both morphologically and behaviorally, the Eel River (ESU 8) stock from which it was mostly derived.

Mokelumne Hatchery stock (CDFG)--The Mokelumne Hatchery is located on the Mokelumne River near Lodi, California. Operations began in 1964. Prior to the establishment of the Mokelumne Hatchery there were numerous releases of steelhead from the Mt. Shasta, Mt. Whitney, Basin Creek, Fern Creek, Kaweah, and Mormon Creek hatcheries into the San Joaquin River Basin. Since there is no documentation of egg collections from local (San Joaquin River Basin) sources, it is presumed that these fish came from sources in the Eel River and Scott Creek/San Lorenzo River Basins. However, the exact origin of these released steelhead is unknown. The hatchery has had to rely on external sources of eggs due to the very poor adult return rate.

Considerable debate has arisen as to whether there were indigenous steelhead in the Mokelumne River prior to releases of out-of-basin hatchery stocks (Cramer et al. 1995, McEwan and Jackson 1996). Therefore, the origin of the few locally returning fish used to establish the Mokelumne River Hatchery broodstock is in question. The majority of the eggs for this hatchery have been supplied by the Nimbus Fish Hatchery, with occasional contributions from the Feather River Hatchery and Coleman NFH (Reynolds et al. 1993, Cramer et al. 1995).

Comments Received

CDFG stated that the Mokelumne Hatchery was constructed to mitigate habitat loss due to construction of Comanche Dam. CDFG stated that since this stock is more closely related to

Nimbus Hatchery steelhead than it is to native Mokelumne River steelhead, it should not be included in the Central Valley ESU.

New Genetic Data

New allozyme genetic samples were collected by CDFG from the Feather River Hatchery, Nimbus Hatchery on the American River, American River naturally produced smolts, and Stanislaus River naturally produced smolts. Genetic analyses conducted by NMFS (NWFSC), indicates that there are two clusters of populations in the Central Valley. Feather River Hatchery and Coleman NFH samples cluster genetically with wild Sacramento River steelhead in Deer and Mill Creeks, while the Nimbus Hatchery sample clusters with Eel River steelhead populations (ESU 8). Although there were no samples from the Mokelumne Hatchery, Nimbus Hatchery has provided the vast majority of eggs to this facility.

BRT CONCLUSIONS

Lower Columbia River (ESU 4) -- Hatchery populations that should be considered part of the ESU:

Late-spawning Cowlitz Trout Hatchery stock (winter run)
Clackamas River ODFW stock # 122

Hatchery populations that should not be considered part of the ESU:

Chambers Creek/lower Columbia River mix (early-spawning winter run)
Skamania Hatchery stock (summer run)
Eagle Creek NFH stock (Clackamas River ODFW stock # 19) (winter run)
Clackamas River ODFW stock # 20 (winter run)

Hatchery populations of uncertain ESU status:

Hood River ODFW stock # 50 (winter run)

A majority of the BRT concluded that both the late-spawning Cowlitz Trout Hatchery stock (winter run) and the late-spawning Clackamas River ODFW stock # 122 should be part of the ESU. For late-spawning Cowlitz River steelhead this decision was based on their April to late-May spawning period that mirrors the spawn timing of wild winter steelhead in this system; the 58 chromosome count exhibited by this stock, which is indicative of native Columbia River Basin origin, in contrast to the 59 or 60 chromosomes seen in Chambers Creek steelhead; and a genetic clustering with native late-spawning winter steelhead in the Clackamas River. A small minority of the BRT were uncertain as to the ESU status of this hatchery stock.

The BRT unanimously agreed that the recently established late-spawning Clackamas River ODFW hatchery stock # 122 was part of the ESU, based on its apparent origin from a local wild population.

The BRT also unanimously determined that the Chambers Creek/lower Columbia River mix of early spawning steelhead hatchery stocks and the Eagle Creek NFH stock (also known as Clackamas River ODFW stock # 19) were not part of the ESU. For both of these hatchery stocks, the BRT's decisions were based on the substantial inclusion of original broodstock from outside the ESU and significant deviation in current run-timing compared to native winter steelhead.

A majority of the BRT also concluded that both the Skamania Hatchery stock (summer run) and the Clackamas River ODFW stock # 20 (winter run) were not part of the ESU. A minority of the BRT were of the opinion that these stocks were part of the ESU or were uncertain

as to their ESU status. The majority opinion for both of these stocks was influenced by information indicating that a portion of the original broodstocks originated from outside the ESU. Also of importance for the Skamania summer hatchery steelhead stock was its 3-month advanced spawn timing compared to wild summer steelhead in the Washougal River. Skamania Hatchery summer steelhead were derived from a combination of native Washougal River summer steelhead and summer steelhead imported from the Klickitat River, which is in ESU 13. The majority conclusion for Clackamas River ODFW stock # 20 (raised at Clackamas Hatchery) was based on its origin from the Eagle Creek NFH stock (ODFW stock # 19), which was derived from a mixture of indigenous Clackamas River steelhead, Big Creek Hatchery steelhead from ESU 3, and Donaldson rainbow trout.

A majority of the BRT were uncertain of the ESU status of the Hood River winter steelhead ODFW stock # 50. Of primary concern were the releases of hatchery steelhead in the Hood River Basin from outside the ESU prior to the establishment of broodstock for this program. Cramer (1991) indicated that prior to these introductions, which started in 1962, winter steelhead entered the Hood River during March through May. Big Creek Hatchery winter steelhead, the source for most of these out of ESU introductions, are spawned predominantly in January (Howell et al. 1985). Currently, broodstock for the Hood River winter steelhead ODFW stock # 50 is collected at Powerdale Dam from late-December through April (M. Jennings⁵). In the absence of genetic data for this stock, the majority of the BRT felt that it had insufficient information to make a decision concerning this stock's ESU status. A minority of the BRT felt that this stock should be included in the ESU.

Importance for recovery

The BRT was divided on whether the late-spawning Cowlitz River Trout Hatchery stock (winter run) and the late-spawning Clackamas River ODFW stock # 122 were essential for recovery; however, a majority of the BRT thought these two stocks were either "not essential" or "probably not essential" for recovery. In both cases a minority of the BRT was of the opinion that these stocks "may be essential" for recovery. A small minority thought Clackamas River ODFW stock # 122 was essential for recovery. The majority opinion of the BRT was influenced by the presence of significant numbers of wild steelhead in the ESU as a whole, which could be used in recovery efforts.

Since the majority of the BRT was uncertain about the ESU status of the Hood River winter steelhead ODFW stock # 50, its importance for recovery remains uncertain as well.

⁵M. Jennings, Program Coordinator, Department of Natural Resources, Confederated Tribes of the Warm Springs Reservation of Oregon, P. O. Box C, Warm Springs, OR 97761. Pers commun., 18 December 1997.

Klamath Mountains Province (ESU 7)--Hatchery populations that should be considered part of the ESU:

Applegate River ODFW stock # 62 (winter run)
Upper Rogue River ODFW stock # 52 (winter run)
Upper Rogue River ODFW stock # 52 (summer run)
Chetco River ODFW stock # 96 (winter run)
Iron Gate Hatchery stock (winter run)
Trinity River Hatchery stock (winter run)
Rowdy Creek Hatchery stock

The BRT unanimously agreed that the Applegate River ODFW stock # 62 (winter run) and the Chetco River ODFW stock # 96 (winter run) were part of the ESU. These decisions were based, to a large degree, on the apparent origin of these stocks from local wild populations. Some members of the BRT noted that transplants of Alsea Hatchery steelhead that may have occurred in the Chetco River prior to initial broodstock collection for Chetco River ODFW stock # 96 occurred over 20 years ago and since that time a mix of wild and hatchery fish has been used as broodstock.

A majority of the BRT concluded that the Upper Rogue River ODFW stock # 52 (winter run), Upper Rogue River ODFW stock # 52 (summer run), and Rowdy Creek Hatchery stock were part of the ESU, based on their origin from local native steelhead. A minority of the BRT thought that these three stocks were not part of the ESU.

A majority of the BRT concluded that Iron Gate Hatchery stock steelhead were part of the ESU, based on its derivation from mostly indigenous steelhead. However, a minority of the BRT were uncertain as to this stocks ESU status, based on its genetic distinctiveness from other steelhead in the Klamath Mountains Province ESU and hatchery practices that do not allow for incorporation of wild fish into the broodstock. Although the Iron Gate Hatchery steelhead sample doesn't cluster tightly with other KMP samples, it is closer genetically to the KMP samples than to steelhead from other geographic regions.

A majority of the BRT concluded that Trinity River Hatchery steelhead were part of the ESU, based largely on its derivation from mostly native local steelhead. A minority of the BRT were uncertain as to the ESU status of this stock. It was noted that virtually all the broodstock used in this program are hatchery fish and hatchery practices differentially select for the early component of the run. It was also noted that Trinity River Hatchery steelhead genetic samples do not fall in a tight cluster with either the Klamath Mountains Province or Northern California ESUs.

Importance for recovery

A majority of the BRT concluded that all hatchery stocks in this ESU were either "not essential" or were "probably not essential" for recovery; however, there was a wide range of minority opinions on this question for all hatchery stocks in this ESU, with the exception of Upper Rogue River summer steelhead (ODFW stock # 52), which was unanimously concluded not to be essential for recovery. This later conclusion was based on the fact that summer run steelhead (Upper Rogue River ODFW stock # 52) do not have access to their historic spawning area above Lost Creek Dam and that this hatchery stock has been kept separate from the wild component for the past 20 years.

A majority of the BRT concluded that Applegate River ODFW stock # 62 (winter run), Upper Rogue River ODFW stock # 52 (winter run), and Rowdy Creek Hatchery stock were either "not essential" or were "probably not essential" for recovery; however, in each case a minority of the BRT felt that these stocks were either "essential" or "may be essential" for recovery. The majority opinion of the BRT was influenced by the presence of significant numbers of wild steelhead in these basins, which could be used in recovery efforts.

A majority of the BRT felt that Iron Gate Hatchery stock are "probably not essential" or are "not essential" for recovery of the Klamath Mountains Province ESU, based on its being a genetic outlier compared to other KMP steelhead samples. Although this hatchery stock has declined precipitously in numbers in recent years, it is unclear whether wild steelhead in Klamath River tributaries have suffered as severe a decline. A minority of the BRT felt that this hatchery stock "may be essential" for recovery, particularly for steelhead in the upper Klamath River.

The BRT was about evenly divided between the Trinity River Hatchery steelhead stock being "not essential" and "probably not essential" for recovery of this ESU. It was noted that naturally spawning steelhead in the Trinity River are still prevalent, although the average 5-year mean of percent hatchery steelhead spawning in the wild is 36%.

Northern California (ESU 8) -- Hatchery populations that should be considered part of the ESU:

- Van Arsdale Fisheries Station stock (Eel River)
- Yager Creek stock (Eel River tributary)
- Ten Mile River stock
- North Fork Gualala River stock

Hatchery populations that should not be considered part of the ESU:

- Mad River Hatchery stock (summer run)
- Mad River Hatchery stock (winter run)

The BRT unanimously concluded that the following steelhead hatchery stocks are part of the ESU, based on their establishment from indigenous broodstock and limited impact from out-of-basin transplants: Van Arsdale Fisheries Station stock, Yager Creek stock, Ten Mile River stock, and North Fork Gualala River stock.

The BRT also unanimously concluded that the Mad River Hatchery summer steelhead stock is not part of the ESU, based on its origin from Skamania summer steelhead from ESU 4 together with some out-of-basin Eel River summer steelhead. Rearing of this stock was terminated at Mad River Hatchery in 1996.

The majority of the BRT concluded that the Mad River Hatchery winter run steelhead stock is not part of the ESU, although a minority of the BRT were uncertain as to the ESU status of this stock or believed it to be part of the ESU. This stock was founded from South Fork Eel River (in the ESU, but from out of the Mad River Basin) steelhead and some local Mad River steelhead. Returns to the hatchery supply most of the egg-take.

Importance for recovery

The BRT expressed a diversity of opinions on the Van Arsdale Fisheries Station steelhead stock and its importance for recovery of the ESU. However, the BRT was in agreement that use of this hatchery stock may be necessary for restoration of steelhead in the upper Eel River. The BRT's concerns included the depressed status of native steelhead in the upper Eel River and the effects on native fish resulting from the pumping of water from the Eel River to the Russian River. A slight majority of the BRT concluded that the Van Arsdale Fisheries Station steelhead stock "may be essential" for recovery, while two separate, but equal, minority opinions were that this stock is "probably not essential" for recovery and that it is "essential" for recovery of winter run steelhead in this ESU.

The BRT unanimously concluded that hatchery steelhead from the Yager Creek stock, Ten Mile River stock, and North Fork Gualala River stock were not essential for recovery of native steelhead in this ESU. These three very small rearing programs operate in watersheds where production of wild fish has declined, but wild steelhead production is still occurring. The Yager Creek stock is planted mainly back into creeks whose watersheds have been logged on private lands, while the Ten Mile and North Fork Gualala Rivers stocks are designed to restore local steelhead fisheries.

Central Valley (ESU 12) -- Hatchery populations that should be considered part of the ESU:

Coleman National Fish Hatchery stock
Feather River Hatchery stock (winter run)

Hatchery populations that should not be considered part of the ESU:

Nimbus Hatchery stock

Mokelumne Hatchery stock

A majority of the ESU concluded that Coleman NFH and Feather River Hatchery steelhead stocks were part of the ESU. In each case, a small minority of the BRT was uncertain as to the ESU status of these two hatchery stocks. Broodstock histories and new genetic evidence showing these two stocks to be similar to wild steelhead in Deer and Mill Creeks were important to the BRT's decision.

The BRT unanimously determined that steelhead stocks at Nimbus and Mokelumne hatcheries were not part of the Central Valley ESU. Nimbus Hatchery steelhead cluster genetically with Eel River (ESU 8) steelhead, the source of much of the steelhead broodstock used to found the Nimbus Hatchery stock. Nimbus Hatchery has provided the vast majority of eggs to the Mokelumne Hatchery.

Importance for recovery

A majority of the BRT concluded that both Coleman NFH and Feather River Hatchery steelhead stocks "may be essential" for recovery, although the BRT noted that these stocks need to be looked at more carefully before they are contemplated for use in recovery programs. For both of these stocks, minority BRT opinions included "probably not essential" and "not essential" for recovery. In the case of the Coleman NFH stock, the BRT noted that most of the original broodstock was taken at dams in the upper Sacramento River and that most historical production occurred above Shasta Dam. The Feather River Hatchery stock was founded from eggs taken from native Feather River steelhead that numbered no more than 100 to 200 wild fish at the time this stock originated. Based on the genetic clustering with Coleman NFH steelhead and wild steelhead in Deer and Mill Creeks, transplants of out-of-basin steelhead into this system may not have been effective.

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